

CORR Insights®: Primary Shoulder Hemiarthroplasty: What Can Be Learned From 359 Cases That Were Surgically Revised?

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Where Are We Now?

During the last 10 years, the national utilization of shoulder hemiarthroplasty has waned substantially among orthopaedic surgeons, and 15-year projections predict further decreases [6]. Increased use of reverse arthroplasty for patients with complex proximal humeral fractures [4, 5], and broadening indications for polyethylene glenoid resurfacing in

younger patients [1] likely contribute to the decline in hemiarthroplasty procedures. Despite these observed trends, there remains a role for primary hemiarthroplasty in patients deemed inappropriate for anatomic total shoulder arthroplasty or reverse arthroplasty because of young age or high activity level.

Although Walch and colleagues [8] found that a surgeon's growing experience with reverse arthroplasty leads to declining rates of postoperative complications, we do not know the impact of a decrease in hemiarthroplasty utilization on surgical proficiency and complications. Indeed, 15 years ago, surgeons were likely to perform a large number of hemiarthroplasty procedures for various indications (including fracture, cuff tear arthropathy, osteoarthritis, and avascular necrosis) both in training and in practice, but today, trained surgeons are unlikely to have had the same experience, making hemiarthroplasty a less-familiar and perhaps more-demanding operation. Because of this, it is important to evaluate critically the reasons for revision of hemiarthroplasties to both refine patient selection and to underscore modifiable

technique-related risk factors for revision.

The investigation by Hackett and colleagues [2] identified glenoid erosion and rotator cuff injury as major etiologies for revision surgery. Like other studies, [3, 7, 8], the authors demonstrated that hemiarthroplasties performed for fracture-related indications were most likely to be revised for either tuberosity nonunion/malunion or humeral decentering relative to the glenoid. These findings support the national trend towards reverse arthroplasty for situations where durable security of the subscapularis, posterolateral rotator cuff, and tuberosities are in question.

Where Do We Need To Go?

Although we have a clear sense of the common characteristics associated with revision shoulder hemiarthroplasties, the incidence of these same variables in patients who do not undergo revision remains unknown. While certain variables, such as centering of the humeral head on the glenoid [3, 9] and tuberosity healing [5], are well-established for determining successful functional outcomes and preventing reoperation after anatomic shoulder arthroplasty, valgus positioning of the humeral component might be a variable that is equally present in patients with and without

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revision. Additionally, if we believe that hemiarthroplasty results are largely linked to a surgeon's technical proficiency, the learning curve and reproducibility of hemiarthroplasty for technically challenging indications, such as glenoid deformity/subluxation and fracture scenarios, remains uncertain. Finally, it is unclear whether hemiarthroplasty is a cost-effective strategy. If the risk of early revision is high and the technical skills necessary to achieve successful results cannot be achieved by enough surgeons, the role of hemiarthroplasty may further decrease in the future as clearer outcomes and cost data become available.

How Do We Get There?

We need longitudinal data both from patients with revisions and controls (surviving implants) in order to determine whether revisions of primary hemiarthroplasties may be avoided by the surgical technique modifications and patient selection criteria suggested by Hackett and colleagues [2]. Such investigations will require large patient numbers and either comprehensive retrospective data with mid- and long-term followup or prospective investigations. Large, high-volume centers and well-established institutional databases, may be best equipped to perform such studies. In 2012, investigators from The Mayo Clinic reported risk factors for revision surgery after humeral head replacement in

1431 shoulders over 3 decades; however, they did not specifically assess the radiographic and technique-related variables described by the authors of the current study [7].

National database registries are also a reasonable option for reporting survival rates and complications associated with hemiarthroplasty; however, given that most registries include multiple surgeons of varying expertise and lack consistent and reliable radiographic data, these types of studies are unlikely to provide the granularity necessary to answer the hypotheses generated by Hackett and colleagues. Prospective study is perhaps the best way to ensure adequate collection of surgical and radiographic data. Unfortunately, given the decreasing utilization of hemiarthroplasty, prospective studies may have difficulty enrolling the numbers of patients needed to make meaningful conclusions and may require costly multicenter investigations that may not be feasible.

Finally, as the complication profiles and survival rates of hemiarthroplasty, total shoulder arthroplasty, and reverse arthroplasty become more apparent, comparative cost-effectiveness analysis modeling of hemiarthroplasty for specific indications can be performed.

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